

Front End Chicane Optimum Parameters

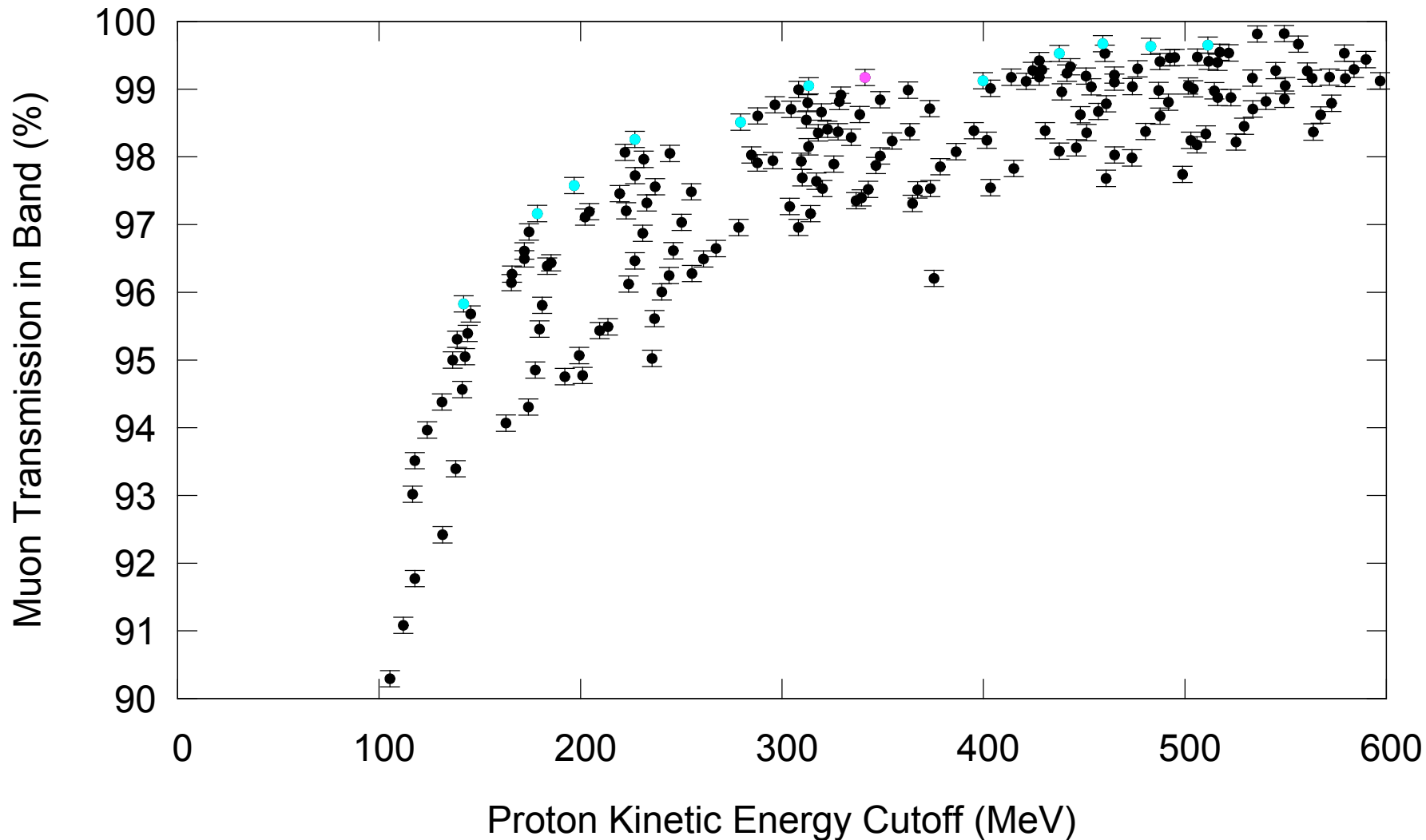
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- Goal: optimize chicane parameters for high energy cutoff
- Not dealing with absorber for low energy protons
- Chicane field is 2 T
 - Could be done for other fields
- 25 cm radius aperture downstream of chicane
 - No aperture in chicane
- Scanned in chicane length and angle

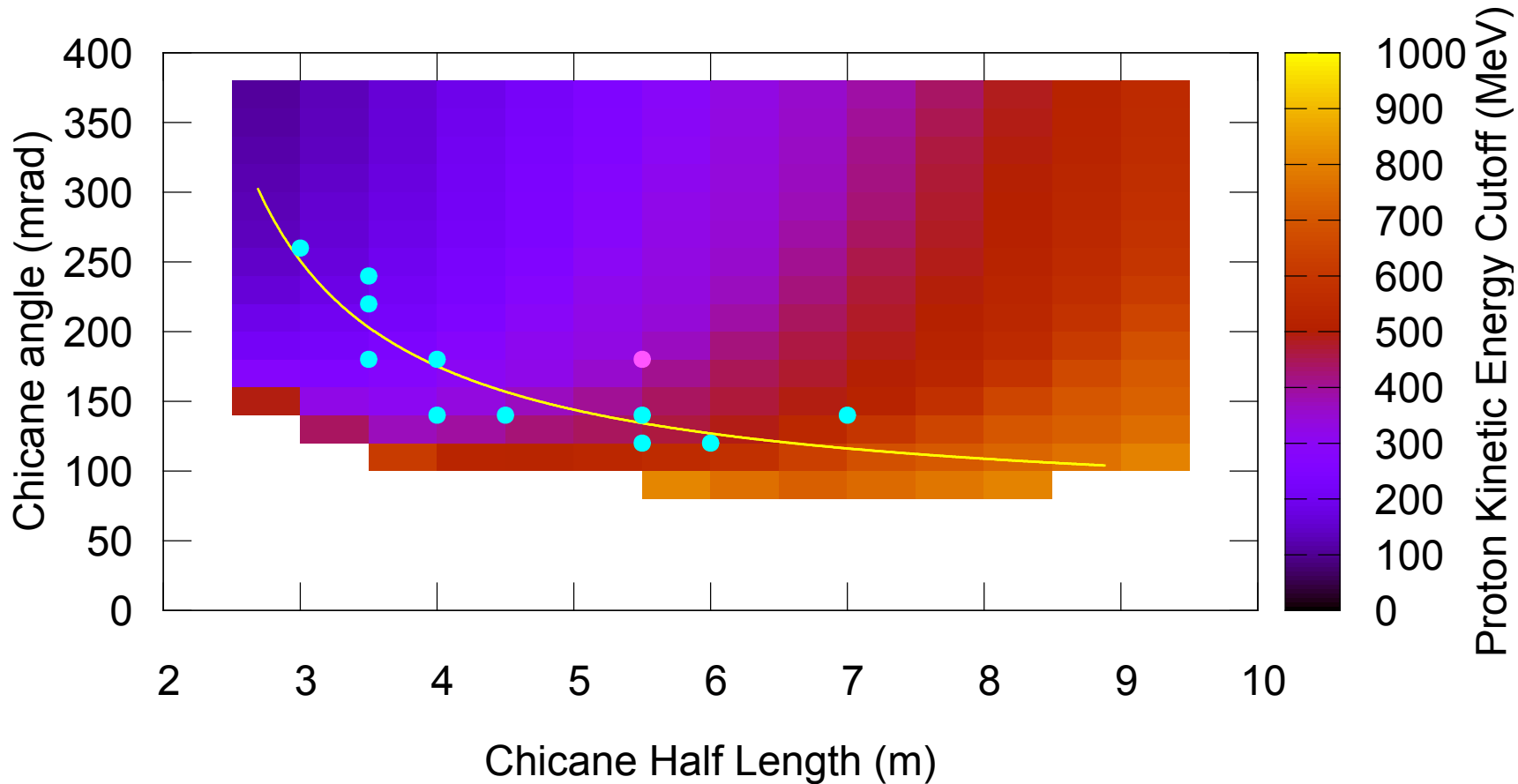
- Scanned chicane angle and length
- Two performance parameters
 - Maximum proton energy
 - Muon transmission from 80 to 260 MeV kinetic energy
- Found solutions with optimum muon transmission vs. proton energy cutoff
- Spectrum did not reflect proton energy cutoff, since only one proton could mess it up
- Solutions in region where cutoff very sensitive to chicane parameters

- Change proton energy cutoff meaning: no more than 2 W of proton energy per proton MW on target above the cutoff
 - Tried 1 W, results still did not reflect actual spectrum cutoff
- Found optimal transmission solutions
 - Dropped one outlier
 - Solutions further from sensitive region
- Fit solutions to a functional form

Transmission vs. Cutoff



Cutoff vs. Length and Angle



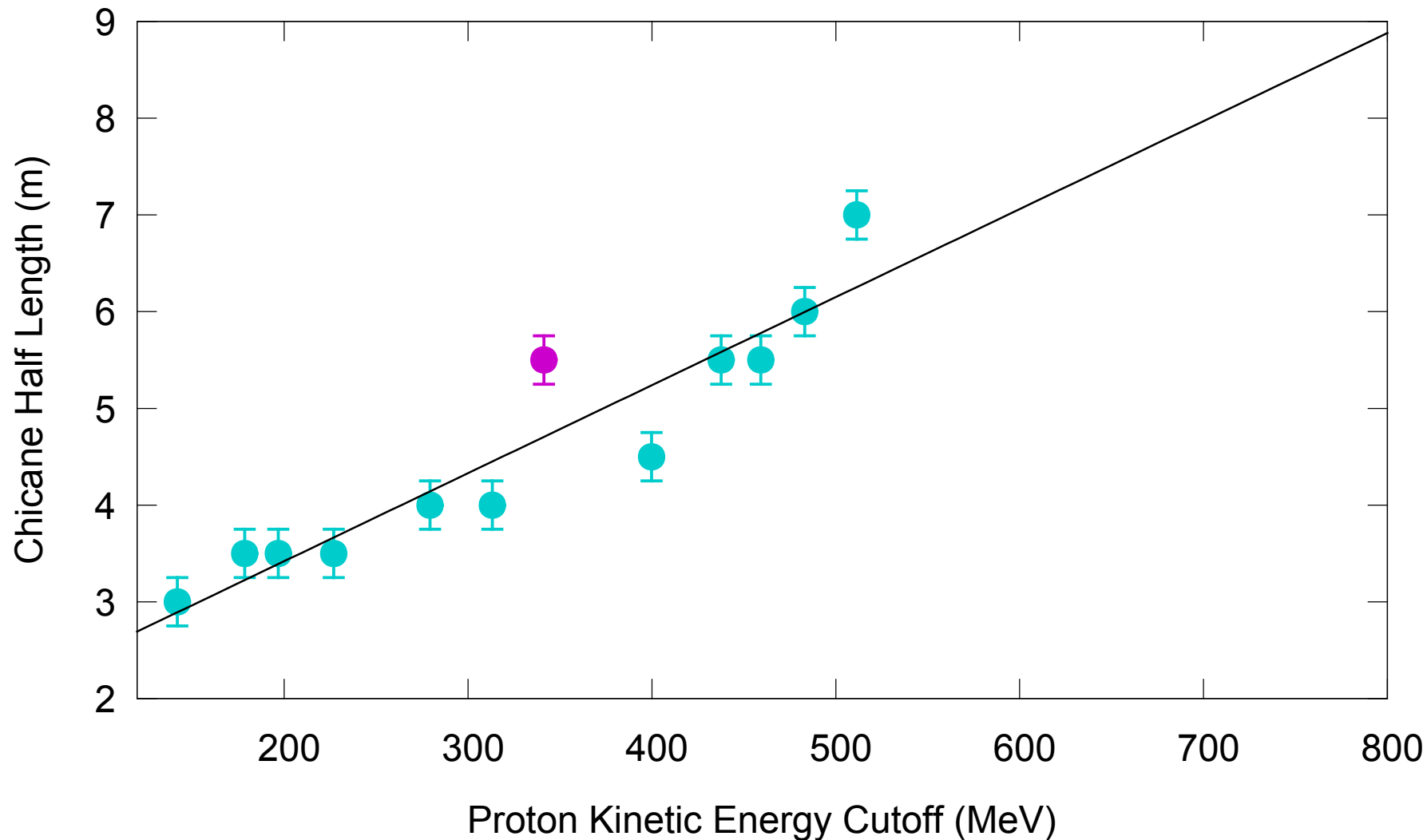
- Fit angle and length vs. proton energy cutoff for optimal solutions
 - Ignore single outlier

$$L = L_0 + L_1 K \qquad \theta = \theta_0 + \theta_1 / K$$

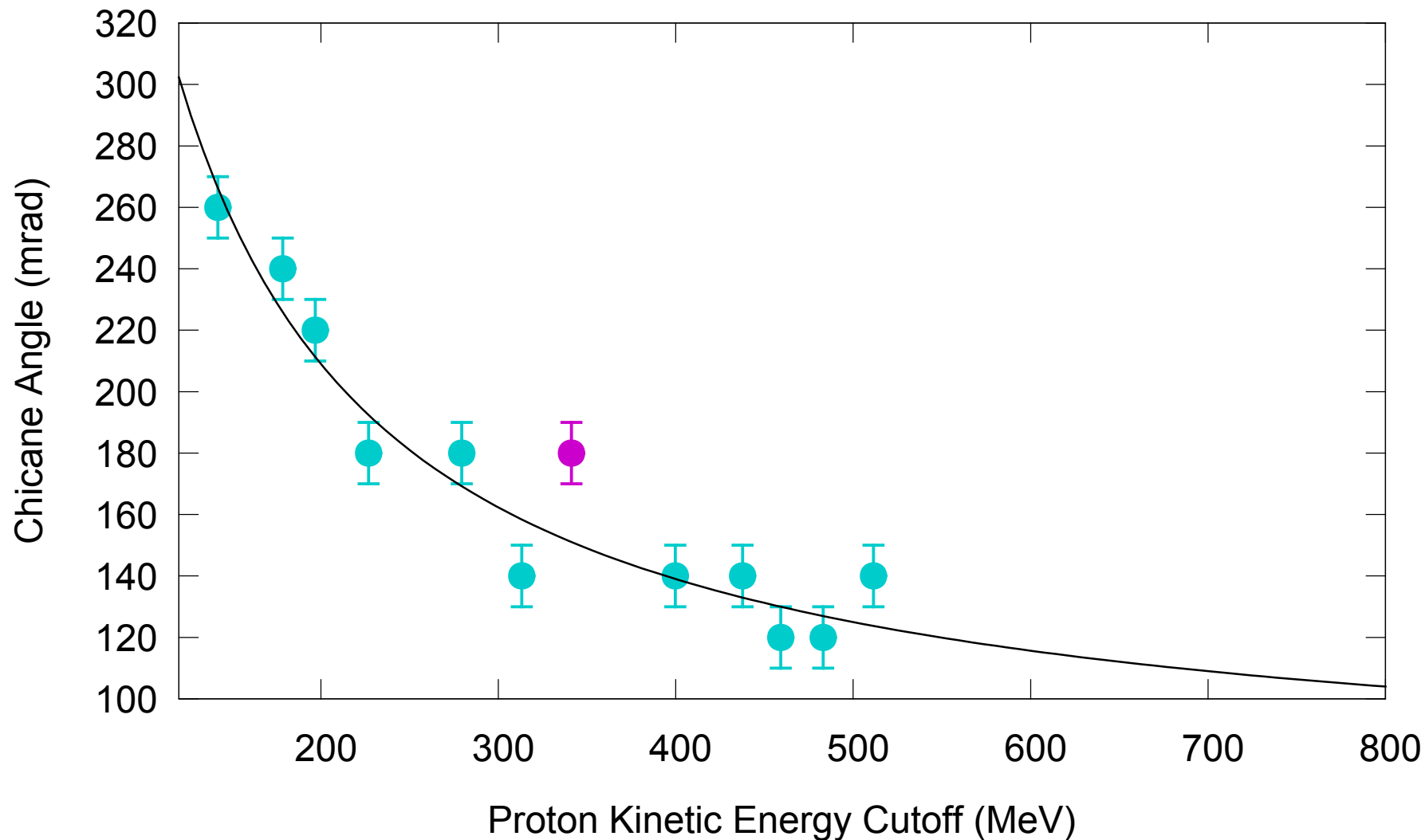
L_0 (m)	1.6	L_1 (m/GeV)	9.1
θ_0 (mrad)	69	θ_1 (mrad GeV)	28

- No physical meaning to these fits
- Quadratic fit for length gives undesirable behavior
- Fit stays nicely away from sensitive region

Length vs. Cutoff



Angle vs. Cutoff



- Have a solution for chicane parameters for a given proton kinetic energy cutoff
- Now do runs according to functional form to check
- Produce distributions at the end of the chicane
- Drift in G4beamline with absorber at two positions
 - At end of chicane
 - At distance where all pions are decayed
 - Optimize absorber thickness for both cases
- Pass to ICOOL to optimize NBPR
 - Still a function of cutoff
 - Additionally two positions for absorber
- Pick best solution, global optimize in G4beamline